BABY 386
MAIN BOARD
USER'S MANUAL

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SECTION 1
Unpacking The Motherboard

1.1 Unpacking the Motherboard

Your motherboard contains sensitive electronic components, which can be easily damaged by static electricity.

In this section, we describe the precautions you should take while unpacking, as well as during installation. It is very important that the instructions be followed correctly, to avoid static damage, and to successfully install the board.

1) The motherboard should be left in its original packing until the time when it is to be installed.

2) Unpacking and installstion should be done on a ground connected anti-static mat. The operator should be wearing an anti-static wristband, grounded at the same point as the anti-static mat.

Inspect the motherboard carton for obvious damage. In case damage is detected, please contact your dealer.

Inside the carton, the card is packed in an anti-static bag, and sandwitched between sheets of sponge. Remove the sponge and lift out the anti-static bag with the card. Extract the card and place it only on a grounded anti-static surface component side up.

Save the original packing materials, in case the card has to be shipped again. Shipping it in any other type of packing may damage the card.

Again inspect the card for damage. Press down all the ICs mounted on sockets to make sure they are properly seated.

DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.

You are now ready to install your motherboard.

1.2 List of the Jumpers Options for Motherboard

EN387 : Enable/disable math co-processor.
JP1 : Bank priority setting.
JP2 : Enable/disable pipelining.
JP3 : Turbo switch.
JP4 : Enable/disable multi-tasking.
JP5 : Display monitor type.

J19 : Speaker connector.
J20 : Power LED and keylock connector.
J21 : Battery connector.
J22 : Keyboard connector.
J50 : Reset connector.
LED1 : Indicator for input frequency from OSC2.
LED2 : Indicator for input frequency from OSC3.

SECTION 2
System overview

2.1 Description

The motherboard is approximately 8.5 by 13 inches and uses very large scale integration (VLSI) technology. it has the following main features:

* Full IBM AT compatiable, but with the performance advantage of a 32 bit architecture.

* Intel's 32 bit 80386 Microprocessor.

* Numaric co-processor support for the Intel 80387.

* Chips and Technologies CS8230 AT/386 CHIPSet.

* Chips and Technologies 82C206 Integrated Peripheral Controller.

* A 2/8MB 32 bit two-way interleaved RAM subsystem (with provisions for 41256 or 1Mb DRAM).

* Optional four-way interleaveing scheme allowing memory expansion to 16MB.

* 256KB ROM subsystem.

* Real-time Clock.

* Keyboard and Speaker attachments.

* A CMOS memory RAM to maintain the configuration of your system.

* A battery backup for the CMOS and the Real-time Clock.

* Several system support functions including:
    Seven channel DMA
    System clock
    Three programmable timers
    Sixteen interrupt levels

* Eight input/output slots of the following types:
    Three 8-bit (62 pin) slots
    Five 8- or 16-bit (62 pin and 36 pin) slots

* One 32 bit high speed memory slot, for a proprietary 2/8MB MEMORY Card.

2.2 Microprocessor

The heart of the motherboard is the Intel's 32 bit 80386 microprocessor. The system therefore controlles a 32 bit memory subsystem, but maintains IBM AT comaptibility. Combined the system feature are as follows:

* DMA and interrupt support capacities
* 32 bit address with a 32 bit memory interface
* 4 level memory protection
* Fixed-point multiplication and division
* Integrates memory management
* Large instruction set
* 4 gigabytes of real address space
* 64 tetrabytes virtual address space
* Two operating modes:

Protected virtual address mode
8086 compatible real address mode

2.3 Real address mode

In the real adress mode, the processor functions as an Intel 8086 microprocessor. Physical memory of a maximum of 1 megabyte can be addressed. If data operands or the instructions try to wrap around the end of a segment, an expection or interrupt may occur: for example, a word with its low-order byte at offset FFFF and its high-order byte at 0000.

The microprocessor addresses memory by generating a 24-bit physical address from a 16-bit segment address and a 16-bit offset address. The segment address is left shifted four bits and added to the offset address to generate a 24-bit absolute address. As the lower 4-bits of the 20-bit segment address are always equal to zero, segment addresses always begin on multiples of 16 bytes.

2.4 Protected mode

This mode provides more physical memory address space, new operations for supporting systems and virtual memory, and memory protection mechanisms.

Protected mode provides 64 tetrabytes of virtual address space mapped into a 4-gigabyte physical address space. An attempt to address memory which does not map to a physical memory location causes a restartable exception, allowing the physical address space to be smaller than virtual address space.

The protected mode uses 32-bit pointers which consist of 16-bit selector and offset components. You should note that the selector specifies an index into a memory resident table instead of the upper 16 bits of a real memory address. The tables in memory give the desired segment a 24-bit base address, while the 16-bit offset is added to the segment base address to form the physical address.

The microprocessor automatically reference the tables when a segment register is loaded with a selector. The memory-bases tables contain 8-byte values called descriptors to which all instructions that load a segment register will refer without additional program support.

2.5 Memory

The motherboard DRAM is available both on board and on the MEMORY card. The motherboard uses 8 strips of Single Inline Memory Modules (SIMMs) and the MEMORY card uses 8 rows of 9 standard DIP RAM, both supporting 256KB and 1MB DRAM chips. One mini-jumper is located on the motherboard to set the interleaving priority of the on board DRAM, another is located on the high speed MEMORY card to set its priority. 1Mb or 256K DRAM types can be used on the motherboard and/or MEMORY card, but the size of DRAM must be the same on each respective device. If a combination of the two types of DRAM is used, the device containing the 1Mb DRAM must have the interleave priority set to the the "LOW" banks. Failing to do so will result in the system assuming that the "HIGH" bank contains 256KB DRAM. Similarly, if two DRAM speeds are used, the bank that uses slower DRAM should have its interleave priority set to the "HIGH" bank. Thus the slower memory will be accessed less frequently for normal DOS operations.

System memory may range from 1MB to 16 MB. Using 256K DRAM, the minimum 1 megabyte total memory will function in a lower performance non-interleaved fashion, and therefore minimum of 2MB are required to enable interleaving. If 1Mb DRAM are used, a minimum of 4rows, or 4MB are required for non-interleaved operation. For interleaved operation all eight rows of the board memory or the memory card must be occupied, meaning 8MB of memory is required.

The full four way interleaving is enabled when one pair of banks (on board or on card) is set as the LOW banks, and another pair of banks is set as the HIGH banks. Failure to comply will result in an error condition. Two high speed RAM cards can be connected through the wafer connecter strip, but the above bank priorities must be removed, since only two pairs of banks are supported, and failure to do so will result in an error condition.

2.6 System Performance

The microprocessor operates at 16 and 20 or 24 MHz which results in a clock cycle time of between 50 and 42 nanoseconds. The DMA controller operates at 6MHz for a clock cycle time of 167 nanosenonds. DMA data-transfer bus cycles can be set between 3 to 5 clock cycles or 0.83 microsecond. Those cycles used in the transfer of bus control are not included.

Overall system performance at 16MHz is approximately equivalent to an 8 MHz IBM AT running 18 to 21MHz, at 20MHz, equivalent to an AT running at 23 to 25MHz, and at 24MHz as fast as an AT running at 30 to 35MHz.

DMA channels 0-3 are used for 8-bit data transfer, channels 5-7 are for 16-bit transfer. The fourth channel is used to cascade channels 0-3 to the microprocessor.

2.7 ROM and RAM Subsystems

The ROM subsystem or basic I/O subsystem (BIOS) consist of two 256KB by 8-bit ROM/EPROM ICs. The code for odd and even addresses are placed in separate ICs. ROM is assigned at the top of the first and the last 1MB address space (hex 0F0000 and hex FF0000). ROM is not parity-checked, and has an accress time of approximately 200 nanoseconds. The system can be set to map all of the ROM BIOS program to the much faster DRAM at start up.

The RAM subsystem begins at address hex 000000 of the 16MB address space. Memory accress time is approximately 100 nanoseconds at 20MHz, and 75 nanoseconds at 24MHz. Memory-refresh requests one memory cycle every 15 microseconds through channel 1 of the timer/counter. The RAM initialization program does the following :

* Performs a memory write operation to any memory location.
* Initializes channel 1 of the timer/counter to a period of 15 microseconds.

SECTION 3
BIOS Overview

3.1 Install the BIOS

Skip the paragraph if the BIOS is already plugged on the motherboard.

Before you begin the installation ensure the Board is power down.

Now plug in the follow order :
ROM with label odd (high) in U44,
ROM with label even (low) in U46.

Following descriptions is for the AMI BIOS. If your BIOS is not the same, please check your BIOS technical information manual.

3.2 Memory Test Bypass

The BIOS performs diagnostics of the system and displays the size of the memory being tested.

Note that you can bypass the memory test by pressing the ESC› key. This option would be quite usefull when the memory on the system is quite large. You should hit the ‹ESC› key when the message Press ‹ESC› Key to bypass MEMORY test appears on the screen.

3.3 CMOS Setup

Immediately after the memory test, you will get the following prompt on the screen:

Press ‹DEL› Key to run SETUP Utility

Hit ‹DEL› key to get into the Setup/Diag Mode. If you hit ‹DEL› key the following message appears on the acreen: WANT TO RUN SETUP OR DIAGS (Y/N)?

If you hit ‹Y› or ‹y› and the ‹ENTER› key you have the another message: SETUP or DIAGS (1/2):

If you hit ‹1› and ‹ENTER› key you have the setup screen.

3.4 Time/Date Setup

The Setup screen looks like below :

```
     CMOS       SETUP
Curren date is : XX-XX-XXXX
Enter new date (NN-DD-YYYY) ?
```

To this question you would have to enter date in the format show on the screen. If you feel that the current date should remain unchanged, you would just have to hit the ‹ENTER› key.

```
Curren time is : XX:XX:XX
Enter new time (HH:MM:SS) ?
```

To this question you key in the time in the format defined. Press ‹ENTER› key alone if the current time is right.

After that, the setup takes two different paths depending upon the CMOS being initialized or uninitialized.

3.5.1 CMOS initialized

Under these conditions you would see the following message :

Primary display is: XXXX

```
Fixed disk drive C type: X(if installed else Not Installed.)
Fixed disk drive D type: X(if installed else Not Installed.)

Diskette drive A is: N
Diskette drive B is: N
Base memory size is:        XXX KB
Expansion memory size is: XXXX KB
Numeric processor: XXXX (present or absent)
Emulate numeric processor: X (if math coprocessor is absent)

Are these options correct (Y/N) ?
```

If you feel that the information displayed above is right, hit ‹Y› and ‹ENTER› key to proceed to system boot with the NEW INFORMATION.

3.5.2 cmos Uninitialized

In this case you would have to enter the type of the fixed Drive C in response to the message:

```
          **** WARNING ****
Entering the wrong disk drive type
cause improper operation of the disk.
If disk not installed press ‹ENTER›
for disk type detail press ‹ESC›

Enter disk drive C type (1-47)?
```

Note that the disk type details are only a key stroke away. Hit ‹ESC› key to find for yourself. You could always come back by hitting ‹ESC› again.

Once you have convinces yourself about the drive type enter the appropriate number and hit ‹ENTER›.

You would then be asked to enter the type od the disk drive D. The procedure for doing this is the same as that for drive C. Remember if you do not have disk drive D on your system, you just have to hit the ‹ENTER› key.

For diskette drive you will have three choice:

(1) 1.2MB, 5 1/4"
(2) 720KB, 3 1/2"
(3) 1.44MB, 3 1/2"

Like fixed disk drive item, just hit ‹ENTER› key for not installed.

BIOS detects a few details by itself, Such like memory size and the math coprocessor.

3.6 Errors Reported by AMI-BIOS

AMI-BIOS performs various diagnostic tests at the time the system is powered up. Whenever an error is encountered during these tests, either you hear a few short beeps or see an error display on your monitor. If the error occurs berfor the display device is initialized the system reports the error by giving a number of short beeps.

If the error is FATAL then system halts after reporting the FATAL error. If the error is NON-FATAL the process continues after reporting the NON-FATAL error.

FATAL errors

Beep Count	Meaning
1	DRAM Refresh failure.
2	Parity Circuit failure.
3	Base 64KB RAM failure.
4	System Timer failure.
5	Processor failure.
6	Keyboard controller - Gate 20 error.
7	Virtual Mode Exception error.
8	Display Memory R/W Test failure. (*)
9	RMO-BIOS Checksum failure.

(*) Nno-Fatal Error.

Error Messages

Fatal Errors
1. Channel - 2 of timer not functional.
2. Stray interrupt sensed in controller.
3. Interrupt controller #2 not functional.

Non-Fatal Errors
1. Keyboard error.
2. Keyboard/Interface error.
3. CMOS battery state low.
4. CMOS system options not set.
5. CMOS checksum failure.
6. CMOS memory size mismatch.
7. CMOS system time and date not set.
8. CMOS display configuration mismatch.
9. Display setting not proper.
10. Keyboard is locked .... Unlock it.
11. Floppy disk controller failure.
12. Hard disk unit 0 error.
13. Hard disk unit 1 error.
14. Hard disk unit 0 failure.
15. Hard disk unit 1 failure.
16. Hard disk unit 1 is not define in CMOS.

SECTION 4
I/O Channel and Connector Specifications

4.1 I/O Channel Pin Assignment

The following figures summarize pin assignments for the I/O channel connectors:

I/O Channel (A side: JA1 through JA8)

I/O Pin	Signal Name	I/O
A 1	-IOCHCK	I
A 2	SD7	I/O
A 3	SD6	I/O
A 4	SD5	I/O
A 5	SD4	I/O
A 6	SD3	I/O
A 7	SD2	I/O
A 8	SD1	I/O
A 9	SD0	I/O
A10	IOCHRDY	I
A11	AEN	O
A12	SA19	I/O
A13	SA18	I/O
A14	SA17	I/O
A15	SA16	I/O
A16	SA15	I/O
A17	SA14	I/O
A18	SA13	I/O
A19	SA12	I/O
A20	SA11	I/O
A21	SA10	I/O
A22	SA9	I/O
A23	SA8	I/O
A24	SA7	I/O
A25	SA6	I/O
A26	SA5	I/O
A27	SA4	I/O
A28	SA3	I/O
A29	SA2	I/O
A30	SA1	I/O
A31	SA0	I/O

I/O Channel (B side: JB1 through JB8)

I/O Pin	Signal Name	I/O
B 1	GND	ground
B 2	RESETDRV	O
B 3	VCC	Power
B 4	IRQ9	I
B 5	-5V	Power
B 6	DRQ2	I
B 7	-12V	Power
B 8	OWS#	O
B 9	+12V	Power
B10	GND	ground
B11	SMEMW#	O
B12	SMEMR#	O
B13	IOWR#	I/O
B14	IORD#	I/O
B15	-DACK3	O
B16	DRQ3	I
B17	-DACK1	O
B18	DRQ1	I
B19	REFRESH#	I/O
B20	SYSCLK	O
B21	IRQ7	I
B22	IRQ6	I
B23	IRQ5	I
B24	IRQ4	I
B25	IRQ3	I
B26	-DACK2	O
B27	T/C	O
B28	BALE	O
B29	VCC	Power
B30	OSC	O
B31	GND	groun D

I/O Channel (C side: JC1 through JC5)

I/O Pin	Signal Name	I/O
C 1	SBHE	I/O
C 2	LA23	I/O
C 3	LA22	I/O
C 4	LA21	I/O
C 5	LA20	I/O
C 6	LA19	I/O
C 7	LA18	I/O
C 8	LA17	I/O
C 9	MEMR#	I/O
C10	MEMW#	I/O
C11	SD8	I/O
C12	SD9	I/O
C13	SD10	I/O
C14	SD11	I/O
C15	SD12	I/O
C16	SD13	I/O
C17	SD14	I/O
C18	SD15	I/O

I/O Channel (D side: JD1 through JD5)

I/O Pin	Signal Name	I/O
D 1	MCS16#	I
D 2	IOCS16#	I
D 3	IRQ10	I
D 4	IRQ11	I
D 5	IRQ12	I
D 6	IRQ15	I
D 7	IRQ14	I
D 8	-DACK0	O
D 9	DRQ0	I
D10	-DACK5	O
D11	DRQ5	I
D12	-DACK6	O
D13	DRQ6	I
D14	-DACK7	O
D15	DRQ7	I
D16	VCC	Power
D17	-MASTER	I
D18	GND	Ground

Memory Card Slot (JE,JF,JG,JH)

It is a total 98 pin I/O channel for 32 bit memory.

4.2 Jumpers

Jumpers at varios locations on the motherboard are used to enable and disable such add-on features as the 80387 math co-processor, RAM above 640k bytes, Programmable Read Only Memory, and color or monochrome monitors.

These items are options that can enhance your system or tailor it to perform a specific job. If after you have received your machine from the dealer, you decide to add or change these options, the jumpers on the motherboard must also be changed to reflect the new configuration.

* EN387

The 80387 co-processor is installed, the jumper, EN387, must be installed.

* JP1 (bank priority set)

LOW : To enable the LOWEST ADDRESS banks on the motherboard
HIGH : To enable the HIGHEST ADDRESS banks on the motherboard

* JP2

CLOSED, Enables pipelining.

* JP3 (turbo switch)

OPEN : To use the OSC, located on OSC3, as the processor clock.
CLOSED : To use the OSC, located on OSC2, as the processor clock.

* JP4

CLOSED, Enable multi-tasking.

* JP5 (color/mono)

OPEN : For Monochrome Video Adapter Card
CLOSED : For Color Video Adapter Card

4.3 Connectors

There are five connectors on the mothermoard besides the fourteen I/O expansion connectors:

* J19 : Specker connector

It is a 4-pin. keyed, BERG strip.

Pin	Assignments
1	Data out
2	key
3	Ground
4	Vcc

* J20 : Power LED and keylock connector

it is a 5-pin BERG strip.

Pin	Assignments
1	LED power
2	Key
3	Ground
4	Keyboard Inhibit
5	Ground

* J21 : Battery connector

It is a 4-pin BERG strip. This is used to supply power to CMOS real time clock when the system is powered off.

Pin	Assignments
1	6V dc
2	Not used
3	Not used
4	Ground

WARNING : The polarity is marked '+' and '-', and must be connected correctly or damage will occur to your system.

* J22 : Keyboard connector

It is a 5-pin, 90 degree PCB mountable DIN connector.

Pin	Assignments
1	Keyboard clock
2	Keyboard data
3	Not used
4	Ground
5	VCC

* J50 : RESET Push-button connector

It is a 2 pin BERG strip. When shorted, this gives hard reset to the system.

Pin	Assignments
1	Hard reset
2	Ground

* SPEED LED

LED1: Indicator for input frequency is from OSC2.
LED2: Indicator for input frequency is from OSC3.

SECTION 5
MEMORY CARD

Is is a add-on card for 32 bit data read and write. There has 72 dual 16/18 pin sockets for DRAM. With these sockets, you can config this memory card as 1MB or 2MB used 256K bit DRAM, even 4MB or 8MB used 1M bit DRAM.

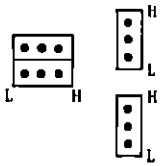
Jumper Setting :

1-2 : LOW, To enable the LOWEST ADDRESS banks on the MEMORY CARD.
2-3 : HIGH, To enable the HIGHEST ADDRESS banks on the MEMORY GARD.

MEMORY SUBSYSTEM

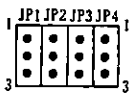
The memory subsystem of 386MB is consisted of two portions, the on board sims memory and 32 bit memory expansion card. Each of them may work indepent or together. As to which one is low bank or high bank, it is decided by the JP1 on the main board and JP1, JP2, JP3, JP4 on the 32 bit memory expansion card.

The JP1 on the main board is marked with L (low) and H (high) position. (Fig. 1)



When these 4 jumpers are all set to "Low" position, the on board sims memory is functioned as the Low Bank memory — Bank 0 and 1 of the system. When set to the "high" position, it is functioned as High Bank memory — Bank 2 and 3.

The JP1,2,3 and 4 on the 32 bit memory expansion card is shown as Fig 2.



When these 4 jumpers are all set to upper position — 1 and 2, the memories on the expansion card is functioned as the Low Bank memory. When set to the lower position — 2 and 3, it's functioned as High Bank memory of the system.

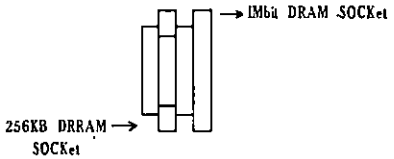
HOW TO USE

A. Use on board sims memory only

When using only on board sims memory as the system's memory, it's necessary to set the JP1 to the "low" position and the on board sims memory will be functioned as the Low Bank memory. In this condition, the U1 — U4 of sims socket will be the Bank 0 and U5 — U8 will be the Bank 1.

B. Use 32 bit memory expansion card only.

When using only 32 bit memory expansion card as the system's memory, it's necessary to set the JP1 — JP4 to the "upper" position, 1 and 2. And the 32 bit memory expansion card will be functioned as the Low Bank memory. In this condition, the U1 — U36 of the memory expansion socket will the Bank 0 and the U37 — U72 will be the Bank 1.



C. Use both on board sims memory and 32 bit memory expansion card as Low Bank memory.

It's necessary to set the on board JP1 to the "low" position and the JP1 — JP4 on the memory expansion card to the "lower" position, 2 and 3. In this condition, the U1 — U4 of the on board sims memory will be the Bank 0 and the U5 — U8 will be the Bank 1. And the U1 — U36 of the memory expansion card will be the Bank 2, the U37 — U72 will be the Bank 3.

D. Use both on board sims memory and 32 bit memory expansion card as High Bank memory.

It's necessary to set the on board JP1 to the "high" position and the JP1 — JP4 on the memory expansion card to the "upper" positin, 1 and 2. In the condition, the U1 — U4 of the on board sims memory will be the Bank2 and the U5 — U8 will be the Bank 3. And the U1 — U36 of the memory expansion card will be the Bank 0, the U37 — U72 will be the Bank 1.

* Please be noticed that the High Bank memory's memory must use only the same type or small memory when work with the low Bank memory.

i.e. when Low Bank memory is 411000, the High Bank can be either 411000 or 41256. When Low Bank memory is 41256, the High Bank memory can only be 41256.

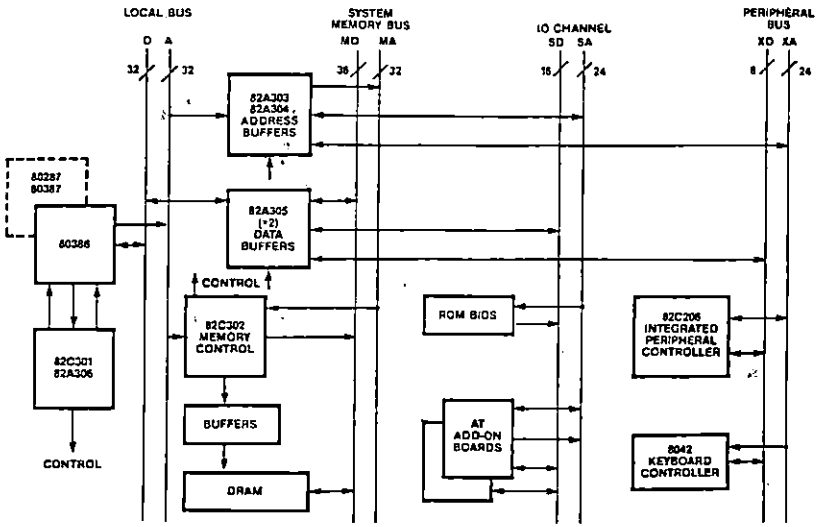


FIGURE 1. AT/386 System Block Diagram

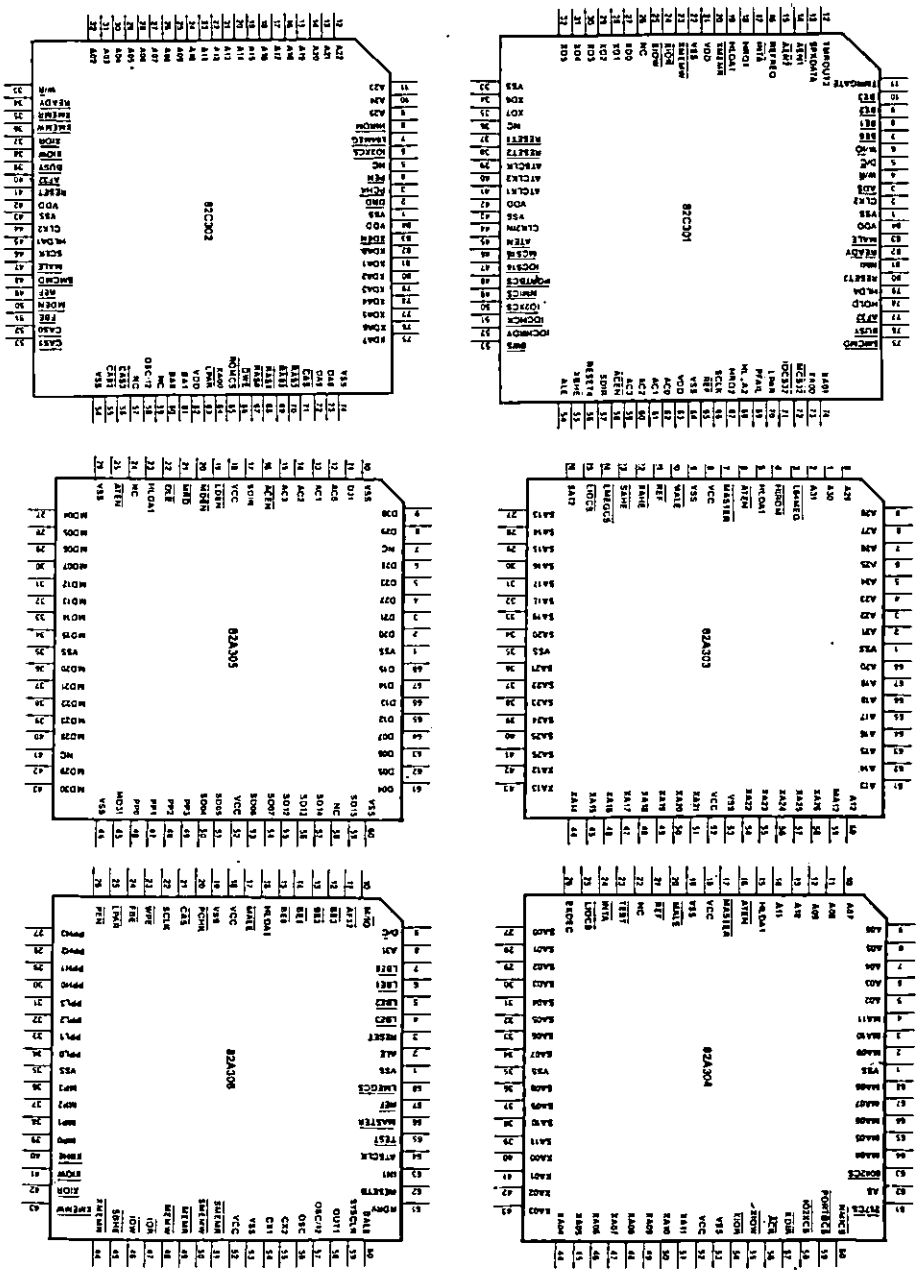


FIGURE 2.

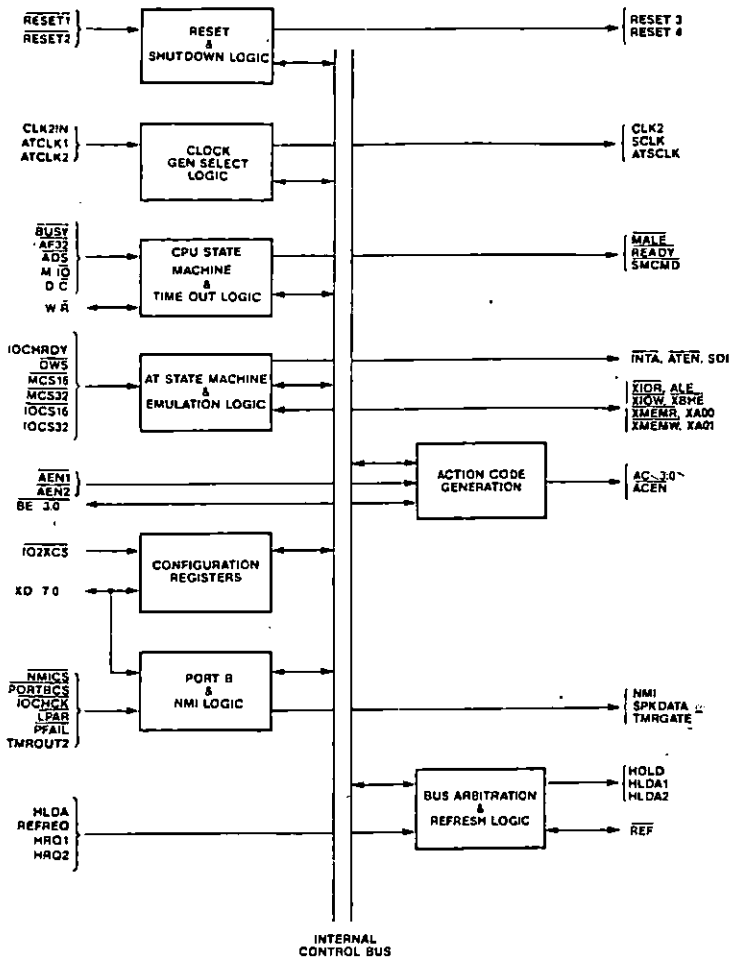


FIGURE 3. 82C301 Functional Block Diagram

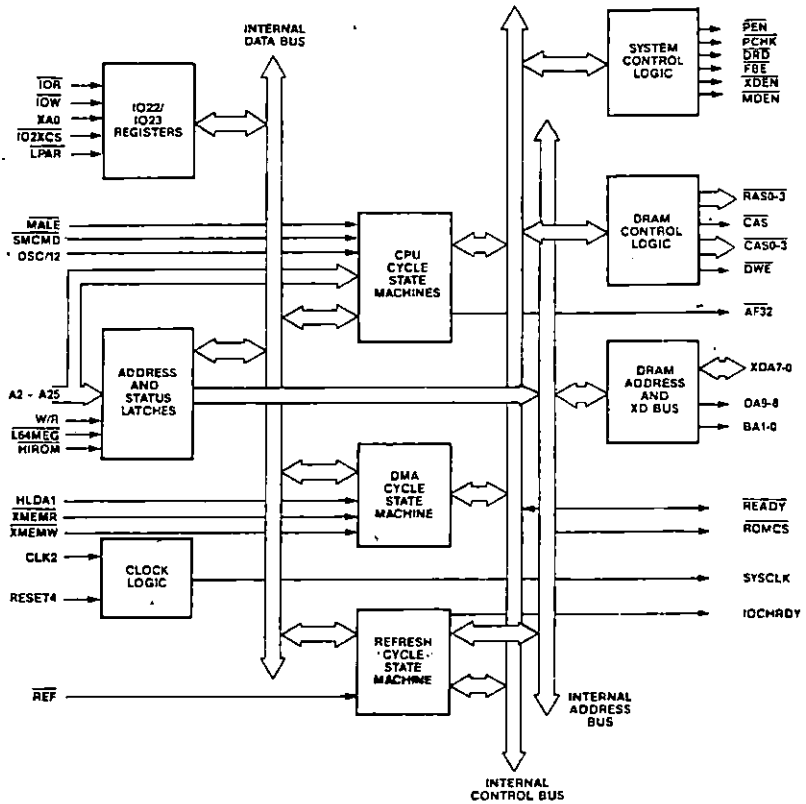


FIGURE 4. 82C302 Functional Block Diagram

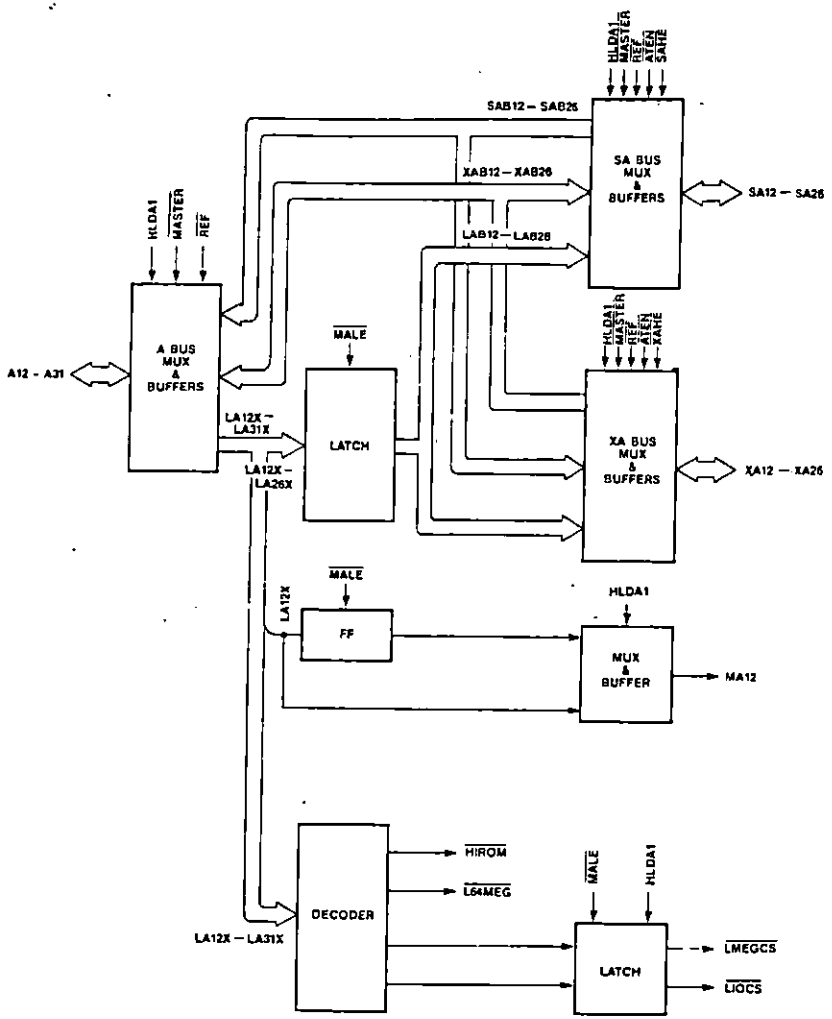


FIGURE 5. 82A303 Functional Block Diagram

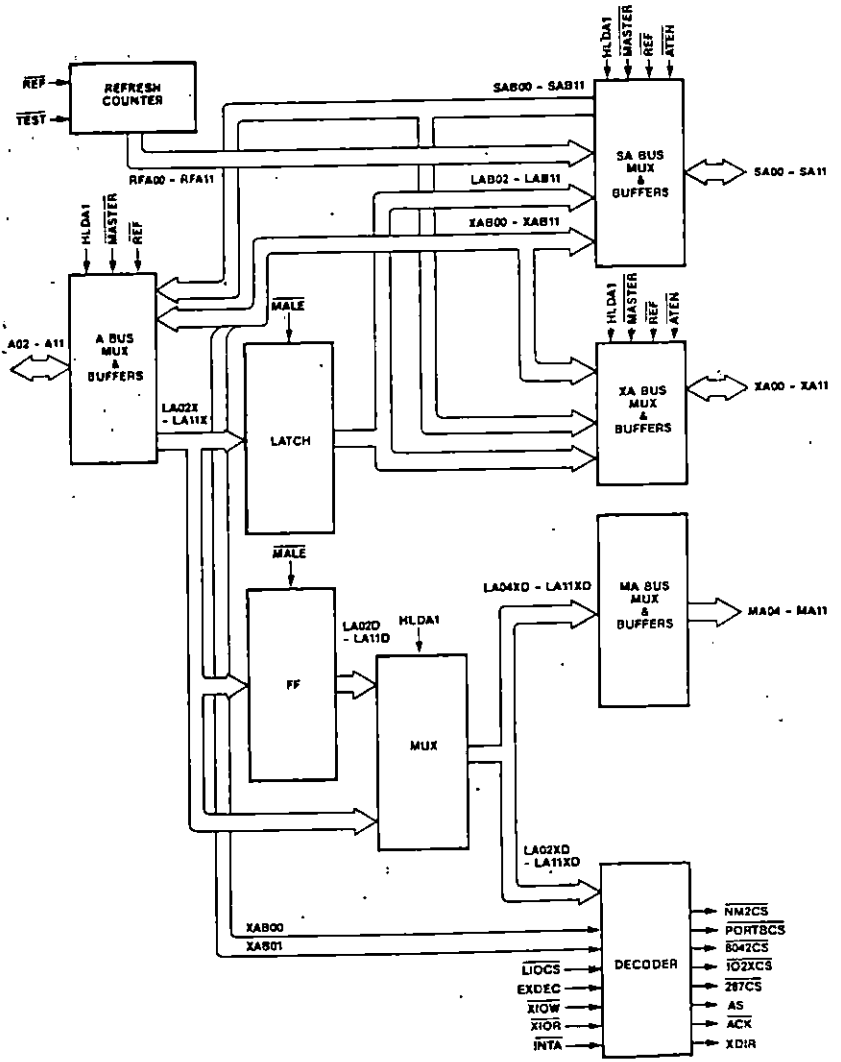


FIGURE 6. 82A304 Functional Block Diagram

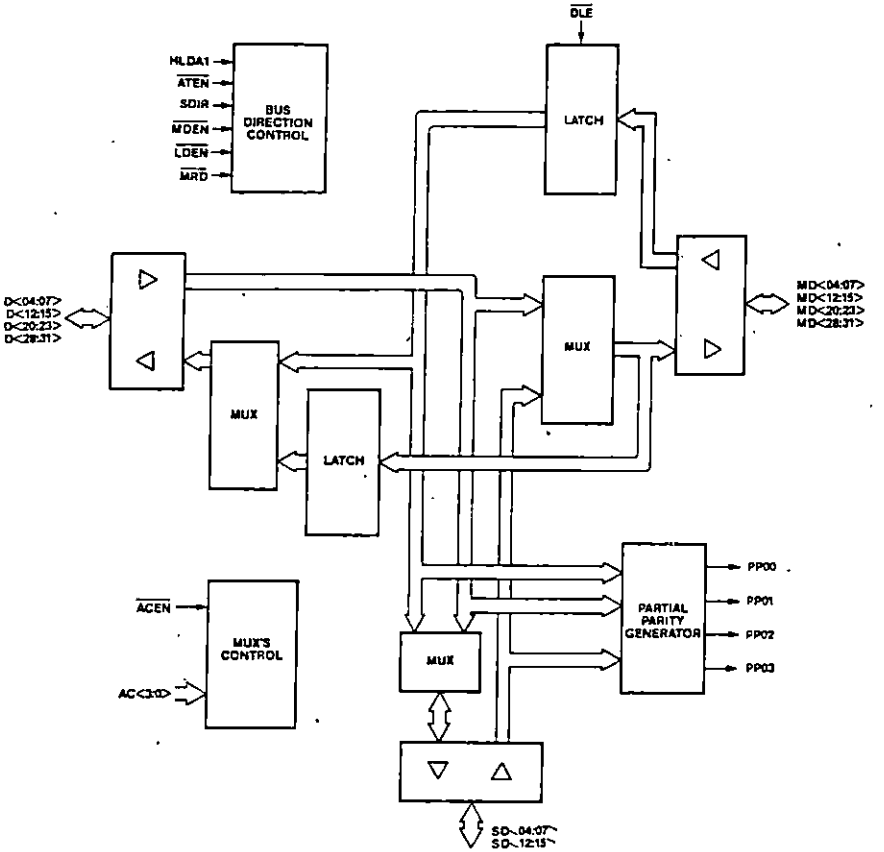
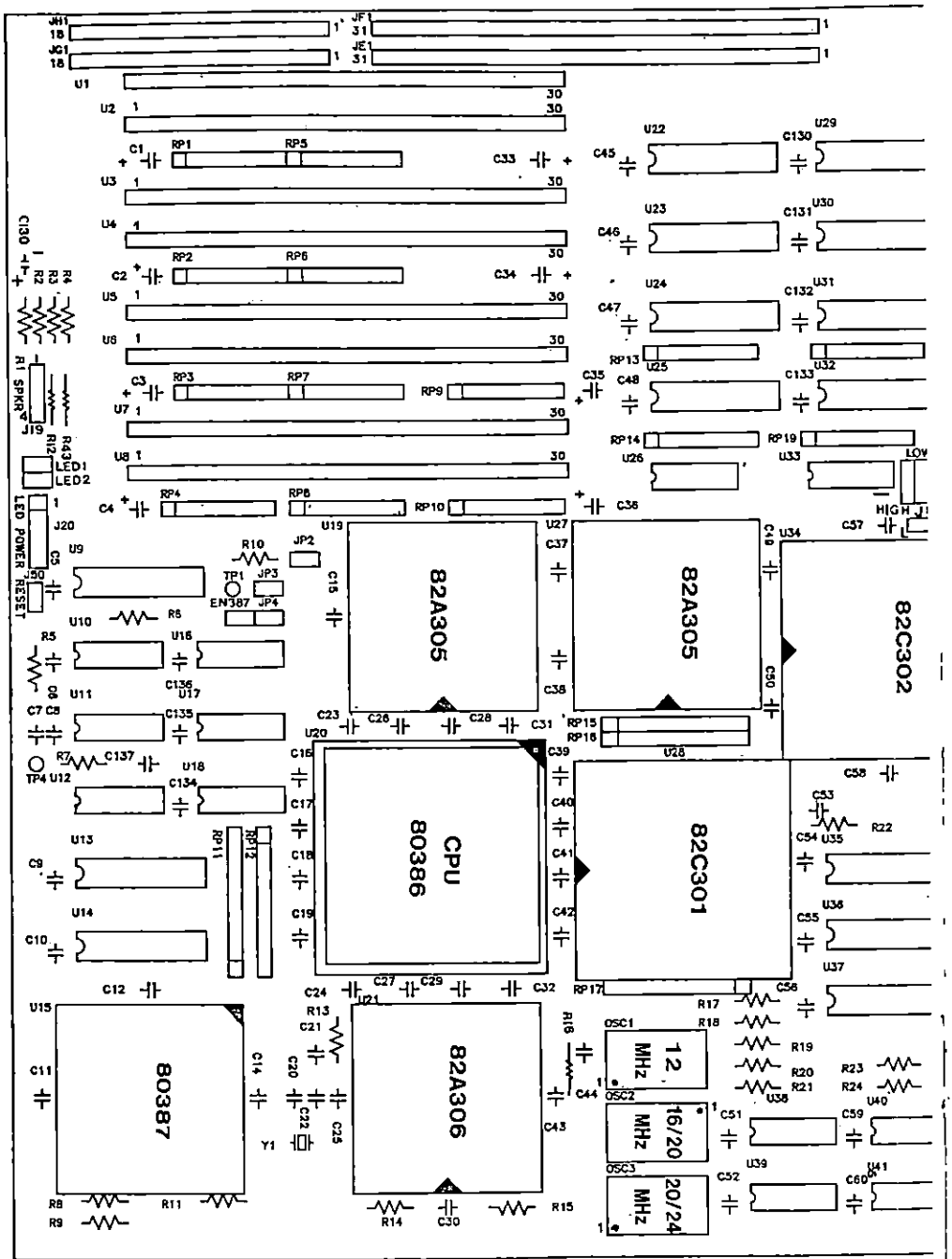
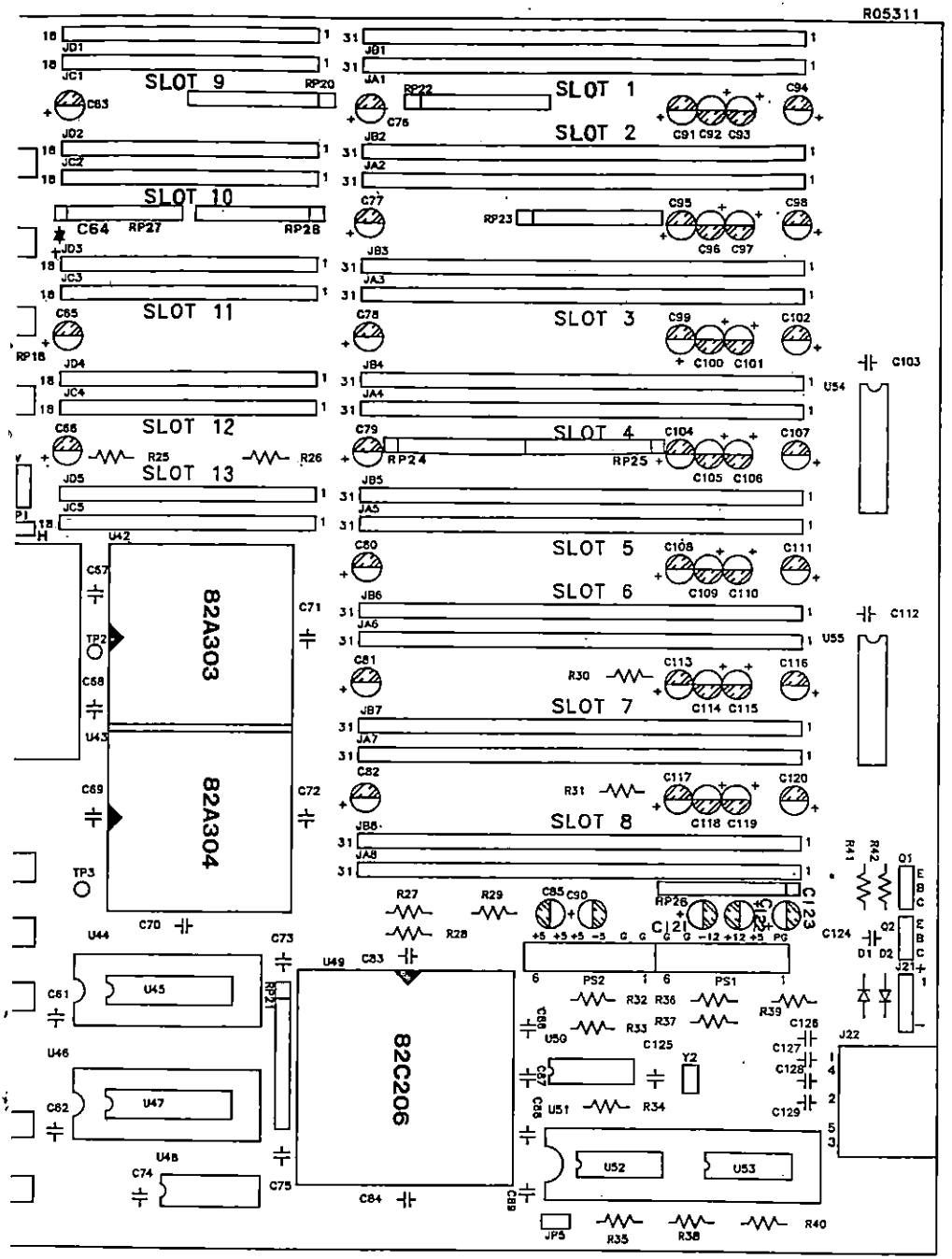


FIGURE 7. 82A305 Functional Block Diagram


82A305
82A305
82C302
CPU
80386
82C301
80387
82A306
12 MHz
16/20 MHz
20/24 MHz
OSC1
OSC2
OSC3
SPKR
LED POWER
RESET
LOW
HIGH


R05311
SLOT 9
SLOT 10
SLOT 11
SLOT 12
SLOT 13
SLOT 1
SLOT 2
SLOT 3
SLOT 4
SLOT 5
SLOT 6
SLOT 7
SLOT 8
82A303
82A304
82C206
JD1
JC1
JD2
JC2
JD3
JC3
JD4
JC4
JD5
JC5
JB1
JA1
JB2
JA2
JB3
JA3
JB4
JA4
JB5
JA5
JB6
JA6
JB7
JA7
JB8
JA8
RP20
RP22
RP23
RP24
RP25
RP26
RP27
RP28
C64
C76
C77
C78
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C80
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C91 C92 C93
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C105 C106
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C109 C110
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C114 C115
C116
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C121
C122
C123
C124
C125
C126
C127
C128
C129
R25
R26
R27
R28
R29
R30
R31
R32
R33
R34
R35
R36
R37
R38
R39
R40
R41
R42
U42
U43
U44
U45
U46
U47
U48
U49
U50
U51
U52
U53
U54
U55
Y2
Q1
Q2
J21
J22
JP5
TP2
TP3

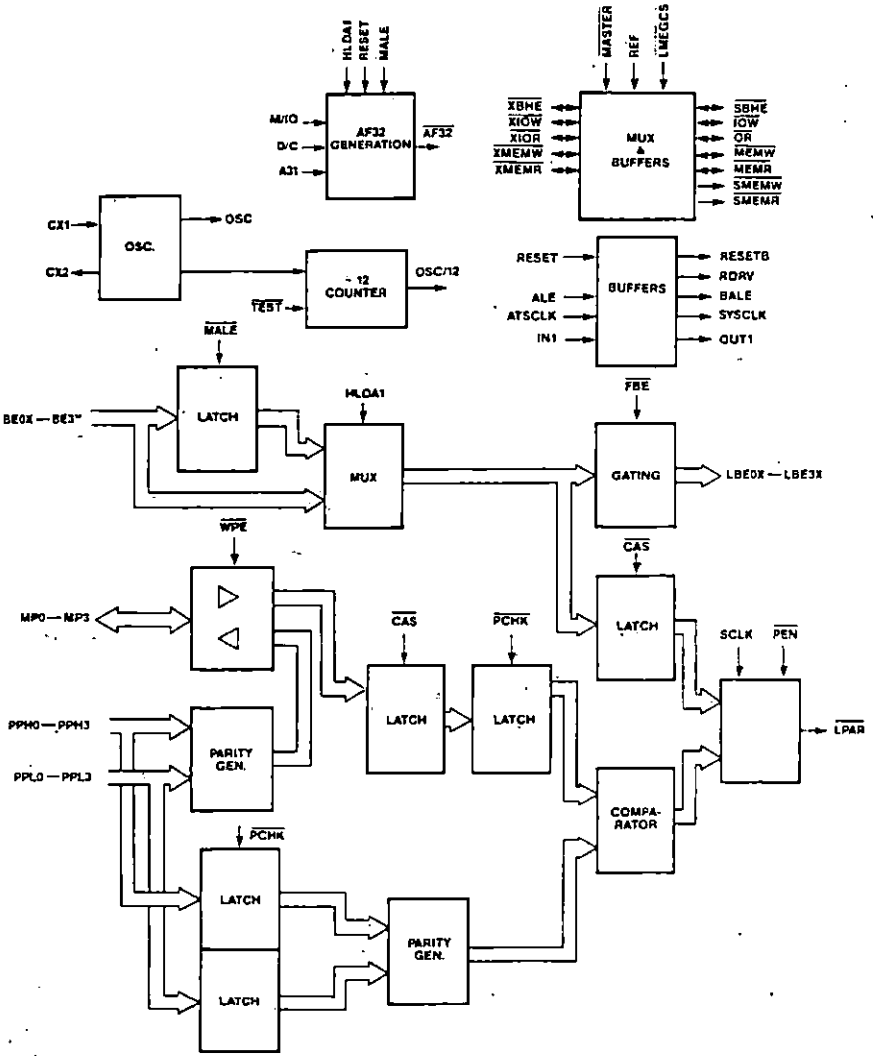


FIGURE 8. 82A306 Functional Block Diagram

ERROR MESSAGES

When the Mother Board is turned on, a Power On Self Test (POST) is performed by the BIOS. This test is tightly interwoven with the system initialization process performed by the BIOS. The POST begins when power is applied to the system and is followed by the system boot, which loads the operating system from the disk.

In general, if the POST detects a system board failure, the system halts and generates an audible alarm.

If a non-system board failure is detected, such as a monitor, keyboard, or option board failure, an error message will be displayed on the screen.

The tables in this appendix provide information about the POST messages, including error messages and information messages, as well as run-time messages. Run-time messages are displayed when an error occurs after the boot procedure has been completed.

The POST messages are divided into four tables and are listed as follows:

1. Error messages	- these indicate a failure in the hardware, software or firmware. Refer to Table 6-1.
2. Information messages	- these provide important information about the power-on and boot process, such as memory status. Refer to Table 6-2.
3. Run time messages	- these are messages that will be delayed when something fails while you are running system or application software. Refer to Table 6-3.
4. Beep sound error message	- these are error messages that come in the form of beeps on the system speaker. Refer to Table 6-4.

NOTE: The following are derived from AMI BIOS technical information. Some of the following informations will differ slightly for other BIOS.

TABLE 6-1. ERROR MESSAGES

MESSAGE	PROBABLE CAUSE	SOLUTION
CHANNEL-2 TIMER NOT FUNCTIONAL	THE TIMER CHIP HAS FAILED	CHECK THE TIMER CHIP ON THE SYSTEM BOARD
KEYBOARD CONTROLLER	KEYBOARD CONTROLLER	CHECK THE KEYBOARD

ERROR SYSTEM HALTED	FIRMWARE ERROR	CONTROLLER.
CMOS BATTERY STATE LOW	BATTERY DEAD OR IT HAS LOST POWER.	REPLACE BATTERIES.
CMOS CHECKSUM FAILURE	THE DATA ON THE CMOS RAM WAS DESTROYED, EITHER BY SOFTWARE (USER'S PROGRAM) OR HARDWARE.	1. RUN FSETUP. EXE ON ARC MS-DOS DISK 2. CHECK SOFTWARE 3. REPLACE BATTERIES
CMOS OPTIONS NOT SET	SOME OPTIONS HAVE NOT YET BEEN SET.	RUN FSETUP.EXE TO SET OPTIONS CORRECTLY.
CMOS INVALID SYSTEM HALTED	CMOS RAM R/W ERROR	CHECK THE RT/CMOS CHIP (82C206) ON THE SYSTEM BOARD.
CMOS DISPLAY CONFIGURATION MISMATCH	CMOS SETTING NOT CORRECT	RUN FSETUP.EXE
INTERRUPT CONTROLLER #2 FUNCTIONAL	1. INTERRUPT CONTROLLER IS DEFECTIVE	REPLACE THE PIC #2 (82C206) ON THE SYSTEM BOARD.
STRAY INTERRUPT SENSED CONTROLLER #1	UNEXPECTED INTERRUPT OCCURED.	REPLACE THE PIC #1 (82C206) ON THE SYSTEM BOARD.
KEYBOARD ERROR	A.KEYBOARD CANNOT BE RESET. B.KEYBOARD SELF TEST ERROR.	1.MAKE SURE THE KEYBOARD CABLE IS CONNECTED PROPERLY 2.MAKE SURE ON KEY NOT JAMMED.
KEYBOARD/INTERFACE ERROR	INTERFACE TEST ERROR A.KEYBOARD CLOCK LINE FAILURE. B.KEYBOARD DATA LINE FAILURE.	1.CHECK THE KEYBOARD CONTROLLER 2.CHECK THE KEYBOARD CABLE CONNECTOR
FLOPPY DISK CONTROLLER FAILURE	THE DISKETTE ADAPTER HAS FAILED.	REPLACE THE CONTROLLER BOARD.
HARD DISK CONTROLLER FAILURE	THE CONTROLLER CARD HAS FAILED.	REPLACE THE CONTROLLER CARD.
DISPLAY SWITCH SETTING NOT PROPER	DISPLAY JUMPER SETTING CONFLICTS WITH ACTUAL DISPLAY ADAPTER.	CHANGE THE JUMPER SETTING ON THE SYSTEM BOARD.
8742 GATE 20 ERROR SYSTEM HALTED	PROTECTED MODE CAN NOT BE ENABLED.	CHECK THE SYSTEM BOARD.
INVALID SWITCH SETTING/MEMORY	ONE OF THE MEMORY CHIPS HAS FAILED OR	CHECK THE SYSTEM BOARD.

FAILURE SYSTEM HALTED	ASSOCIATED CIRCUITY HAS FAILED.	1.MEMORY DATA LINE 2.MEMORY ADDR.LINE 3.MEMORY CHIPS 4.CHANGE BAD PART
DMA CONTROLLER ERROR SYSTEM HALTED	A.PAGE REGISTERS R/W ERROR F/F B.LATCH F/F ERROR	CHECK THE SYSTEM BOARD AND REPLACE IF NECESSARY.
DMA UNIT #1 ERROR SYSTEM HALTED	CHANNEL REGISTERS R/W ERROR.	REPLACE THE DMA #1 (82C206) ON THE SYSTEM BOARD.
DMA UNIT #2 ERROR SYSTEM HALTED	CHANNEL REGISTERS R/W ERROR.	REPLACE THE DMA #2 (82C206) ON THE SYSTEM BOARD.
INTERRUPT CONTROLLER #1 ERROR SYSTEM HALTED	INTERRUPT CONTROLLER IS DEFECTIVE.	REPLACE THE PIC #1 (82C206) ON THE SYSTEM BOARD.
HARD DISK UNIT 0 FAILURE	1.THE HARD DISK UNIT 0 HAS FAILED. 2.MAYBE HARD DISK TYPE ERROR 3.MAYBE HARD DISK WAS NOT INITIATED.	1.REBOOT. IF THAT DOES NOT WORK, REPLACE THE HARD DISK. 2.RUN FSETUP,EXE TO CHECK IF HARD DISK TYPE IS OK. 3.RUN HDFORMT.COM TO INITIATE HARD DISK NOTE: ALL DATA WILL BE DESTROYED.
HARD DISK UNIT 0 ERROR	1.THE HARD DISK UNIT 0 IS DEFECTIVE. 2.MAYBE HARD DISK TYPE ERROR. 3.MAYBE HARD DISK WAS NOT INITIATED.	
HARD DISK UNIT 1 FAILURE	1.THE HARD DISK UNIT 1 HAS FAILED. 2.MAYBE HARD DISK TYPE ERROR. 3.MAYBE HARD DISK WAS NOT INITIATED.	
HARD DISK UNIT 1 ERROR	1.THE HARD DISK UNIT 1 IS DEFECTIVE. 2.MAYBE HARD DISK TYPE ERROR. 3.MAYBE HARD DISK WAS NOT INITIATED.	

CMOS SYSTEM TIME & ATE NOT SET	THE TIME OR DATE IS OUT OF RANGE.	RUN FSETUP.EXE AND RESET THE TIME OR DATE.
CMOS MEMORY SIZE MISMATCH	EITHER BASE OR EXTENSION MEMORY SIZE SETTING CONFLICT WITH ACTUAL MEMORY SIZE.	RUN FSETUP.EXE AND RESET. REPLACE THE MEMORY CHIP ON THE SYSTEM BOARD OR ON THE PERIPHERAL CARD.
KEYBOARD IS LOCKED UNLOCK IT	THE KEYBOARD LOCK ON THE FRONT OF THE COMPUTER IS ACTIV-ATED.	UNLOCK THE KEYBOARD.
HARD DISK UNIT 1 TYPE UNDEFINED IN CMOS	UNIT 1 EXISTS, BUT IS NOT DEFINED IN THE CMOS RAM.	RUN FSETUP.EXE AND DEFINE THE TYPE NO.
DISKETTE BOOT FAILURE INSERT BOOT DISKETTE IN DRIVE A.	A.DISKETTE READ ERROR. B.DRIVE ERROR.	REPLACE THE SYSTEM DISKETTE. REBOOT OR CLEAN THE R/W HEAD IN DRIVE A.
INVALID BOOT DISKETTE INSERT BOOT DISKETTE IN DRIVE A.	NOT A BOOTABLE SYSTEM DISKETTE.	REPLACE WITH A SYSTEM DISKETTE. REBOOT.
DRIVE NOT READY ERROR INSERT BOOT DISKETTE IN DRIVE A.	THERE IS NO DISKETTE IN DRIVE A.	PLACE A SYSTEM DISK IN DRIVE A AND TRY AGAIN.

TABLE 6-2. POST INFORMATION MESSAGES

MESSAGE	MEANING
ADVANCED MICRO DEVICES..... COPYRIGHT... 198X, 198Y. ALL RIGHTS RESERVED.	THIS MESSAGE IS DISPLAYED ON THE SCREEN AFTER A BOOT AND INDICATES THAT THE POST HAS STARTED. YOU CAN GET THE BIOS VERSION NUMBER FROM THIS SCREEN.
XXXXX KB OK	INDICATES THAT THE MEMORY SIZE AGREES WITH THE CMOS RAM. (INCLUDES BASE MEMORY AND EXTENDED MEMORY)
PRESS (ESC) KEY TO BYPASS MEMORY TEST.	THE MEMORY TEST IS TIME CONSUMING. YOU CAN SKIP IT BY PRESSING (ESC).

RUN SETUP UTILITY PRESS (F1) KEY TO RESUME	1.ERROR(S) WERE FOUND WHILE RUNNING THE POST. PRESSING THE F1 KEY ALLOWS THE SYSTEM TO CONTINUE. 2.RUN THE SETUP PROGRAM AND TRY AGAIN.

SYSTEM SETTING INFORMATION FOLLOWS.....

TABLE 6-3. RUN TIME ERROR MESSAGES:

FROM:	PARTITION SECTOR	AND BOOT SECTOR
INVALID PARTITION TABLE	INVALID PARTITION TABLE IN HARD DISK UNIT 0.	1.RUN FDISK.COM ON YOUR ARC DOS DISK TO BUILD A VALID PARTITION TABLE.
ERROR LOADING OPERATING SYSTEM	BOOT SECTOR READ ERROR. HARD DISK UNIT 0 IS DEFECTIVE.	1.RUN FORMAT.EXE TO VERIFY HARD DISK. NOTE: ALL DATA WILL BE DESTROYED.
MISSING OPERATING SYSTEM	INVALID BOOT SECTOR ON THE ACTIVE PARTITION.	1.RUN SYS.COM TO RECREATE DOS. 2.RUN FORMAT.EXE TO RECREATE DOS SYSTEM PARTITION. NOTE: ALL DATA WILL BE DESTROYED.
NON-SYSTEM DISK OR DISK ERROR REPLACE AND STRIKE ANY KEY WHEN READY	WHEN YOU BOOTED, THE DISK IN DRIVE A. WAS NOT A SYSTEM DISK.	REPLACE THE DISK IN DRIVE A. WITH A SYSTEM DISK AND REBOOT.
DISK BOOT FAILURE	INVALID BOOT SECTOR OR DISKETTE ERROR.	REPLACE THE DISK IN DRIVE A. WITH A SYSTEM DISK AND REBOOT.
BAD OR MISSING COMMAND INTERPRETER	COMMAND.COM IS MISSING FROM THE DEFAULT DRIVE.	INSERT THE ARC DOS IN DRIVE A. AND REBOOT THE SYSTEM.

TABLE 6-4. BEEP ERROR MESSAGES.

This information should be dirived from your BIOStechnical information manual or section 3.6 errors report from AMI-BIOS.

MS-DOS

DOS:

DOS is abbreviation for Disk Operating System and refers to a disk-based operating system.

An OS is a collection of procedures and techniques for co-ordinating and controlling the overall operation of the computer system. According to the system configuration, it may be stored in system memory, a hard disk, a floppy disk, etc.

In addition, the OS contains utility programs which enable the development of a user's program or the handling of files.

Note: The examples in the Manual are written in uppercase letters. During actual input, however, either up-percase or lowercase letters may be used since the DOS does not distinguish between them while accepting commands.

THE ENTER KEY

When you enter an MS-DOS command or your response to a prompt, first key in the file names, etc. using the alphanumeric keys on the key-board then press the Enter key to input the command to the computer. The computer accepts a keyed-in command only after the Enter key is pressed, so be sure to press this key after command entry.

CTRL+C

When you wish to terminate execution of a command, press the C key while the Ctrl (Control) key is held down. The execution will be broken with the sign "C" and the DOS will return to the command waiting mode prompting A.

STARTING THE DOS

1. Set-up your system referring to installation 4 of this manual and the user's manual supplied with your peripher-als. Make sure that the connections between them are made correctly.

2. Switch on the power of the peripherals first and then switch on the 386MB System. The computer has an Intial Power-on Diagnostics program and will begin to check itself with this program.

3. While the Diagnostics program is running, insert the DOS disk (SYSTEM Disk I) into the drive slot of the FDD unit. If you have a dual drive system, insert the disk into the upper drive, make sure that the disk is inserted correctly. Then, lock the lock lever by turning it clockwise. A short beep tone is heard from the computer and FDD will begin to access the DOS disk.

4. Now, all the initialization procedures above are completed successfully. The computer makes a first request prompting that:

```
Current date is Tue 1-01-1080
Enter new date:
```

Type the current date, for example 2-21-1986, and press the Enter Key. Be sure to insert a hyphen or dash between each item. If you input the date improperly, the following messages will be displayed:

```
Invalid date
Enter new date:
```

Reinput the date according to the correct syntax, inserting hyphens between month, day and year. Next, the computer asks you to input another item:

```
Current time is 0:00:19.87
Enter new time:
```

Input the current time by typing on the keyboard, for example, 14:05:00. If you feel that entering the date and time is too complicated, simply press the Enter key at each prompt. The computer will accept this; however, a recording for the update of each file will not be made.

5. The following prompt will appear:

```
A
```

This shows that the DOS is now ready to accept and execute your command entry. This letter "A" means that the computer is ready to access a diskette in disk drive A as a system drive. We call this drive A, the default drive.

6. In a 386MB System which has a dual drive, you can change the default drive. If you wish to access the disk inserted into drive B, type:

```
B:
```

and press the Enter key.
to return the default drive to A, type:

```
A:
```

and press the Enter key.
The prompt A will be indicated again and the computer access drive A.

FILES

WHAT IS A FILE?

Before you put your documents back to the bookshelf, you might put them into a file folder which has a special name of title. The term "file", as used in this Manual, describes the same concept as this. Just as you would do, the computer takes information from a "bookshelf" called a disk according to the particular file name written on the backbone of the file folder, then opens it to pick up the data which you want. Thus, in the example above, a file that has been taken out is returned to the same bookshelf. However, a computer can process files in various ways. For example, the computer preforms its job by handling a collection of information, called a file.

HOW TO NAME YOUR FILES

A file name consists of two parts; the file name and the file extension. In naming a file, follow the rule below:

A file name can be from 1 to 8 characters.

A file extension can be three or fewer characters.

A period must be inserted between file name and file extension.

The following characters are allowed for making up file names.

Letters from A to Z

Numbers from 0 to 9

Other characters:!, @,#,%,&,(,),-,

You may type any file name in lowercase of uppercase letters and MS-DOS will translate these letters into uppercase characters.

CHECKING A DIRECTORY

If you want a list of the files that are on your disk, type the following after the A prompt to display the file DIRectory:

DIR

and press the Enter key.

All the files on the DOS disk will be listed on the screen; for example:

A: dir

Volume in drive A has no label Director of A:

```
COMMAND   COM    23210   9-30-85   12:00p
VDISK     SYS     2926   9-30-85   12:00p
ANSI      SYS     1593   9-30-85   12:00p
ENHDISK   SYS     1569   9-30-85   12:00p
CLOCK     SYS     1458   9-30-85   12:00p
FORMAT    COM     8989   9-30-85   12:00p
CHKDSK    COM     9435   9-30-85   12:00p
SYS       COM     3823   9-30-85   12:00p
DISKCOMP  COM     2897   9-30-85   12:00p
COMP      COM     2470   9-30-85   12:00p
MODE      COM     4180   9-30-85   12:00p
FDISK     COM     7200   9-30-85   12:00p
BACKUP    COM     5465   9-30-85   12:00p
RESTORE   COM     5247   9-30-85   12:00p
ASSIGN    COM     1509   9-30-85   12:00p
SORT      EXE     1664   9-30-85   12:00p
FIND      EXE     6403   9-30-85   12:00p
MORE      COM     8291   9-30-85   12:00p
PRINT     COM      282   9-30-85   12:00p
TREE      COM     8291   9-30-85   12:00p
LABEL     COM     1756   9-30-85   12:00p
BASIC     COM     1239   9-30-85   12:00p
BASICA    COM     1173   9-30-85   12:00p
BASICA    EXE    66576   9-30-85   12:00p
GRAPHICS  COM     3048   9-30-85   12:00p
EDLIN     COM     7261   9-30-85   12:00p
SHARE     EXE     8304   9-30-85   12:00p
ATTRIB    EXE    15091   9-30-85   12:00p
SELECT    COM     1714   9-30-85   12:00p
KEYBGR    COM     8085   9-30-85   12:00p
KEYBFR    COM     8157   9-30-85   12:00p
KEYBUK    COM     7551   9-30-85   12:00p
KEYBIT    COM     7770   9-30-85   12:00p
KEYBSP    COM     8194   9-30-85   12:00p
DISKINIT  COM     9168   9-30-85   12:00p

36 File(s)  46186 bytes free
```

If you want to stop the scrolling on the display, press the "S" key while the Ctrl key is depressed. Listing of the files in the directory will stop temporarily so you can check contents.

Another way of viewing the file DIRectory is shown below. If you wish to list the entire contents of the disk within the same screen, type:

```
DIR/W
```

and press the Enter key.

In this case, information other than file names and file extensions is not displayed.

BACK-UP OF DOS DISK

Before you start operation to use DOS, it is strongly recommended that you make one or more working disk copies of the original MS-DOS disk in case the original DOS disk is phys-

ically or magnetically damaged. This copying process is usually called "back-up".

Before you copy the DOS to another disk, however, you should prepare a suitable disk for the 386MB System by executing the FORMAT command followed by Copy command or Diskcopy command which accomplishes both functions.

BACK-UP FOR SINGLE DRIVE

The following Back-up procedure is applicable to the 386MB

Start the DOS and type the following at the command-waiting prompt A:

DISKCOPY

and press the Enter key. The following message will be displayed:

Insert source diskette in drive A:

Strike any key when ready

At this time, the DOS disk should be in the disk drive on the computer. If not, insert in into the drive then press any key. The disk drive will start to read the contents on the DOS diskette and the computer will start to store this information into memory.
When the memory becomes full, the following message will appear:

Copy 9 sectors per track, 2 side(s)

Insert target diskette in drive A:

Strike any key when ready

Remove the DOS diskette from the drive then insert a new "formated" disk. Press any key when ready. The date stored temporarily in memory will then be written to the new diskette. When this action is finished, the computer asks again:

Insert source diskette in drive A:

Strike any key when ready

You must swap disks several times until the following message appears:

Copy complete

Copy another (Y/N)?

Enter "Y" if you want to make another back-up copy or enter "N" to terminate this program.

BACK-UP FOR DUAL DRIVE (OPTIONAL)

If your 386MB System is equipped with two disk drives, you can copy the DOS diskette to another disk without swapping diskettes.

First, make sure that the DOS is in command-waiting mode and the DOS diskette is inserted into the upper drive.

Diskcopy A:B:

The following message will appear on the screen:

Insert source diskette in drive A:

Insert target diskette in drive B:

Strike any key when ready

Insert a new "formatted" diskette into drive B and press any key. The computer will then begin to copy the information stored on the DOS diskette to the disk inserted in drive B with this message:

Copying 9 sectors per track, 2 side(s)

When the copy is completed, the computer will display the following prompt:

Copy complete

Copy another (Y/N)?

Enter "Y" to make another back-up disk or "N" to quit this disk copy program.

GLOSSARY

ALPHANUMERIC

A contraction of the words alphabetic and numeric, an alphanumeric refers to a character that is a letter of the alphabet or a numeric.

BACK-UP DISK

A back-up disk consist of a copy of a master diskette or of original data, and is used as a working copy to prevent accidental loss or damage of the original data during computer operation.

"BASIC"

An acronym for Beginner's All-purpose Symbolic Instruction Code, BASIC is procedure level programming language that is widely used by beginners to computer operation and to programming.

BIT

A contraction of binary digit, a bit is the smallest unit of data in the binary notation consisting of either "0","1"

BYTE

A byte signifies the number of consecutive measurable bits that represent a character to the computer, usually consisting of 8 bits.

COMPATIBILITY

1. A characteristic of computers whereby one computer can accept and process data from another computer without requiring conversion or code modification.

2. A characteristic of software to hardware (programs, peripheral devices, etc.) whereby it can be accepted by another computer system.

FLOPPY DISK

A thin, flexible platter coated with magnetic material and used as the storage medium of a floppy disk drive, supplementing the main memory. It is non-volatile, meaning that it retains its data even after the power supply is switched off.

FORMATTING (OF FLOPPY DISK)

The preparation of a disk by setting its track and sector information before use, permitting data structures of a specific type to be accepted by the disk.

FUNCTION KEYS

Special keyboard keys which are pre-set or definable, permitting functions to be easily specified to suit a specific applications environment.

HARD DISK

A magnetic medium used in a hard disk drive system which enables the processing of larger volumes of data at faster speed than a floppy disk drive system.

INITIALIZATION

As soon as the system power is switched on, initialization is performed by a set of procedures to originate or establish the basic conditions or start-up status.

IPL (INITIAL PROGRAM LOADER)

An initialization procedure that fetches a program or operating system from an external medium to the computer, loading the main memory with the data records which are involved in the process.

"K" BYTES

1,024 (2 to the power of 10) bytes, not to be confused with "k" bytes which equal 1,000 (10 to the power of 3) bytes.

KEYBOARD

A typewriter-like device, having an array of lettered or numbered pushbutton keys, that is used to input encoded alphanumeric data upon detecting that its keys have been depressed.

"M" BYTES

A storage area, usually within the computer wherein the computer "memorizes" data to that it can be copied, stored, and retrieved.

MICROPROCESSOR

One of the most important components of a microcomputer, the microprocessor typically designates the large-scale integration (LSI) chip which contains the CPU.

NUMERIC DATA PROCESSOR (NDP)

A chip device for processing numeric data exclusively at high speed.

NUMERIC KEY PAD

An input device, forming a section of a keyboard, that contains those keys generlly used on simple calculators for extensive numeric input or computation.

OPERATING SYSTEM

A collection of procedures and techniques for coordinating and controlling the overal operation of the copmuter system. According to the system configuration, it may be stored in system memory, a hard disk, a floppy disk, etc.

PERIPHERAL

Various types of input/output devices that operate in combination or conjunction with the computer, but are not a physical part of the computer, e.g., display monitor, printer, disk drive, etc.

PROGRAM

A detailed sequence of instructions that tell a computer the required steps for solving a total problem or application.

"RAM"

Random Access Memory provides for the temporary storage of data and permits a non-sequential access of memory to be performed at any storage location point, resulting in a faster access speed than that of a ROM.

"ROM"

An acronym for Read-Only Memory, ROM information is usually preprogrammed either permanently or semi-permanently with a microprogram or fixed program, fitting the computer to a specific application, ROM data can only be read out but not revised during use.

RS-232C

RS-232C is a standardized communications interface between data communication equipment (e.g. a modem) and data-processing terminal equipment, conforming to Standard RS-232C of the Electronics Industries Association (EIA).

WRITE PROTECTION

The procedure of preventing the accidental destruction of the contents of a diskette such that its data can be read out but no new data can be written onto the disk.

"WRITE PROTECT" NOTCH

By covering the write-protect notch, located on the side of the diskette, you render it write protected.

THE EXTENDED SETUP

NOTE: If your have a mistake setup and the screen can not display any message after rebooting, just press the <Ins> key to clear the setuped value before you turn the power on. If you do that the system will use the default setup value supported by the BIOS, and will have the message on the screen.

After memory check out or warm start, the following message will apear:

Press <Del> key to run SETUP/EXTD-SET

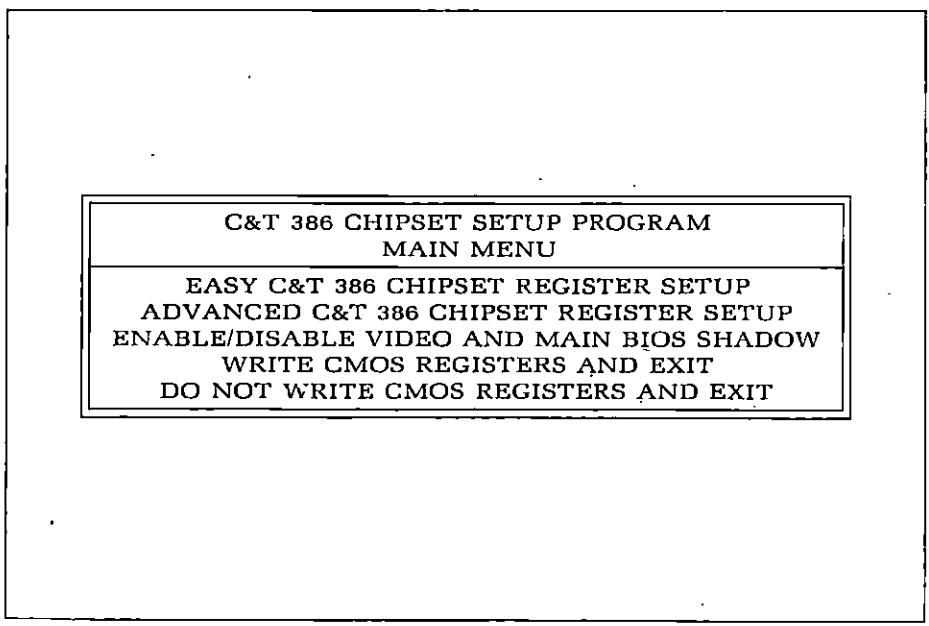
If you press the <Del> key, another message will apear:

Want to run SETUP/EXTD-SET (Y/N)? y
SETUP/EXTD-SET (1/2)? 2

Type "y" and "2" to go into the extended setup utility.

The screen will show as below:

EXTENDED CMOS SETUP PROGRAM Ver — 1.50, (C) 1988, American Megatrends Inc.


C&T 386 CHIPSET SETUP PROGRAM
MAIN MENU
EASY C&T 386 CHIPSET REGISTER SETUP
ADVANCED C&T 386 CHIPSET REGISTER SETUP
ENABLE/DISABLE VIDEO AND MAIN BIOS SHADOW
WRITE CMOS REGISTERS AND EXIT
DO NOT WRITE CMOS REGISTERS AND EXIT

You can use the arrow keys to highlight one of the five items and use the <Enter> key to select it.

When you select the "EASY C&T 386 CHIPSET REGISTER SETUP", the following screen will appear:

EXTENDED CMOS SETUP PROGRAM Ver — 1.50, (C) 1988, American Megatrends Inc.

Memory Configuration

Bank	Enable/Disable	DRAM Type	Waitstate
0	ENABLED	256K	1 WAIT STATE
1	ENABLED	256K	1 WAIT STATE
2	DISABLED		1 WAIT STATE
3	DISABLED		1 WAIT STATE

Clock Source

Processor Clock	Bus Clock	DMA Clock
PROCESSOR OSCILLATOR	PROC CLOCK/3	SCLK/2

Shadow Ram\Memory Interleave

F0000H, 64K	C0000H, 16K	C4000H, 16K	Interleave
DISABLED	DISABLED	DISABLED	ENABLED

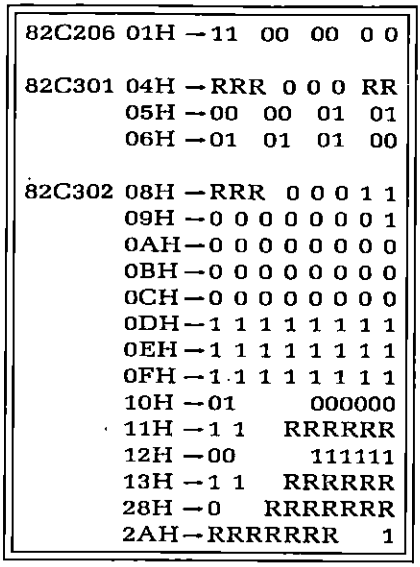
ZERO WAIT STATE ONE WAIT STATE
MOVE BAR-<PgUp/PgDn> EXIT-<ESC>

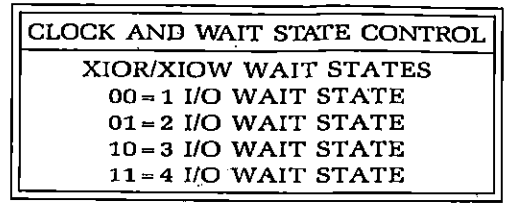
You can use the arrow keys to highlight which item you want to change, and use the <PgUp/PgDn> to change the value.

You can get the more instuction from the screen.

When you select the "ADVANCED C&T 386 CHIPSET REGISTER SETUP", the following screen will appear:

EXTENDED CMOS SETUP PROGRAM Ver — 1.50, (C) 1988, American Megatrends Inc.





You can use the arrow keys to highlight which item you want to change, and use the <PgUp/PgDN> to change the value.

You can get the more instuction from the screen.

Indexs	Bits	Function
01H		Clock and wait state control
	7:6	XIOR/XIOW wait states 00 1 I/O wait state 01 2 I/O wait state 10 3 I/O wait state 11 4 I/O wait state Default
	5:4	16 bit DMA wait states 00 1 DMA wait state Default 01 2 DMA wait state 10 3 DMA wait state 11 4 DMA wait state
	3:2	8 bit DMA wait states 00 1 DMA wait state Default 01 2 DMA wait state 10 3 DMA wait state 11 4 DMA wait state
	1	EMR bit 0 disable Default 1 enable

	0	CLK bit 0 DMA CLK = SCLK/2 1 DMA CLK = SCLK

Indexs	Bits	Function
04H		Version/Processor clock select/NMI source
	7:6:5	Reserved
	4	Processor Clock Select. If SCLK is selected as the source for BCLK, CLK2 source must not be selected as BCLK. 0 Use processor oscillator input. Default. 1 Use AT bus state machine clock (SYSCLK*2).
	3	Power Fail Warning Enable 0 Power Fail NMI not enable. Default. 1 Power Fail NMI enable.
	2	Local Bus READY timeout NMI Enable 0 READY timeout NMI not enable. Default. 1 READY timeout NMI enable.
	1:0	Reserved
05H		Command delay The value for each one of the command delay field is defined as: 0 0 cycle delay 1 1 cycle delay 2 2 cycle delay 3 3 cycle delay
	7:6	AT Bus 32 bit memory command delay Specifies between 0 and 3 BCLK cycles for command delay during an AT bus 32 bit memory cycle.
	5:4	AT Bus 16 bit memory command delay Specifies between 0 and 3 BCLK cycles for command delay during an AT bus 16 bit memory cycle.
	3:2	AT Bus 8 bit memory command delay Specifies between 0 and 3 BCLK cycles for command delay during an AT bus 8 bit memory cycle.
	1:0	AT Bus I/O cycle command delay Specifies between 0 and 3 BCLK cycles for command during an AT Bus I/O cycle.

Indexs	Bits	Function
06H		Wait States/Bus Clock Source
	7:6	32 bit AT bus wait state select 0-3 wait states per 32 bit transfer on the AT bus. Each wait state is 2 BCLK cycles. 0 3 cycle delay 1 2 cycle delay 2 1 cycle delay 3 0 cycle delay
	5:4	16 bit AT bus wait state select 0-3 wait states per 16 bit transfer on the AT bus. Each wait state is 2 BCLK cycles. 0 3 cycle delay 1 2 cycle delay 2 1 cycle delay 3 0 cycle delay
	3:2	8 bit AT bus wait state select 0-3 wait states per 8 bit transfer on the AT bus. Each wait state is 2 BCLK cycles. 0 3 cycle delay 1 2 cycle delay 2 1 cycle delay 3 0 cycle delay
	1:0	Bus Clock Source Select 0 Use Proc Clock/3 for AT bus state manchine. 1 Use Proc Clock/2 for AT bus state machine. 2 Reserved 3 Use ATCLK input pin for the AT bus state machine
08H		Identification
	7:5	Reserved
	4	Middle Boot Space Write Protect. 0 Read/Write of 256KB RAM at 16128K 00FC0000H. 1 Read-Only of 256KB RAM at 16128K 00FC0000H.
	3	Middle Boot ROM disable 0 The boot/BIOS ROM located just below 16MB is enable. This is necessary for 286 compatibility 1 The boot/BIOS ROM located just below 16MB is disable.

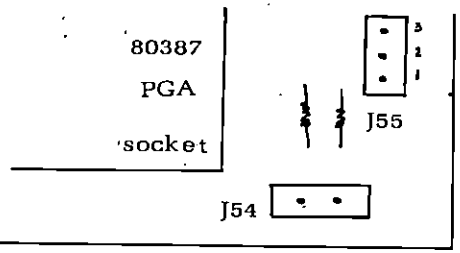
Indexs	Bits	Function
08H	2	16MB I/O Channel Memory Limit 0 AF32 will not be asserted for addresses > 16MB This should only be used if external logic can recognize addresses above 16MB. 1 AF32 is asserted for addresses < 16MB. Since I/O channel memory can not normally be configured above 16MB, accessing above 16MB will cause a READY timeout if that feature is enabled. This is necessary during setup because memory address above 16MB that are not enabled for local memory could wrap into a valid I/O channel memory location.
	1	Minimum memory configuration after reset. Used during initialization. 0 256K only enable. 1 Normal configuration controlled by registers OAH to OFH.
	0	Single bank/interleave select 0 Disable interleave (single bank). 1 Enable interleave.
09H		RAM/ROM Configuration in boot area
	7	RAM at 768K C0000-CFFFFH (EGA)
	6	RAM at 832K D0000-DFFFFH
	5	RAM at 896K E0000-EFFFFH
	4	RAM at 960K F0000-FFFFFH (BIOS) Bits 7:4 disable writing to RAM located in the BIOS area in 64KB blocks. BIOS data. 0 Read/Write. 1 Read-Only.
	3	ROM at 768K C0000-CFFFFH (EGA)
	2	ROM at 832K D0000-DFFFFH
	1	ROM at 896K E0000-EFFFFH
	0	ROM at 960K F0000-FFFFFH (BIOS) Bits 3:0 enable substitution of the BIOS ROM located below 1MB with RAM at the same location in 64KB blocks. This should the done after the BIOS code is copied from the ROM and the RAM locations have been write protected using bits 7:4. 0 Disabled. 1 Enabled.

Indexs	Bits	Function
0AH		Address Map 256K 04000-05FFFFH
0BH		Address Map 384K 060000-07FFFFH
0CH		Address Map 512K 080000-09FFFFH
0DH		Address Map 640K 0A0000-0BFFFFH
0EH		Address Map 768K 0C0000-0DFFFFH
0FH		Address Map 896K 0E0000-0FFFFFH
		0 Address is on or controlled by the system board. 1 Address is on the I/O Channel. This permits 16K blocks of memory to be disabled allowing ROMs memory expansion mechanism (EMS or XMA) or memory mapped I/O devices to reside within the lower 1MB address space.
10H 12H	-	Bank 0/1 Type/Start Address Bank 2/3 Type/Start Address
	7:6	DRAM Type 0 none (bank disabled) 1 256K words 2 1M words 3 Reserved
	5:0	Starting Address The DRAM Type determines which address bits are valid in the address recognition process.
11H 13H		banks 0/1 Timing banks 2/3 Timing
	7	DRAM RAS precharge. 0 3 CLK2 times 1 5 CLK2 times
	6	Access wait states 0 0 wait states 1 1 wait states
	5:	Reserved
28H		Error Source/Address
	7	Parity check disable 0 enable 1 disable
	6:0	Reserved

Indexs	Bits	Function
2AH		AF32# Control
	7:1	Reserved
	0	First 256K AF32# Control 0 No AF32# generated 1 Generate AF32#

80387 SUBSYSTEM

New function desription about the 80387 subsystem. This modification is for the 80387 can be worked fine under 24MHz using the 80387-20.



for this purpose, the motherboard has two new jumper, marked J54 and J55. Its function is desoriped as below:

J54: 80387 mode select
OPEN : sync. mode
CLOSE: async. mode

J55: 80387 clock source
1-2 short: using the 386CLK2
2-3 short: using the OSC3 clock output

So this two jumper is used under three condition:

1. 386 CPU is running 16MHz

J54 should be OPEN
J55 should be short on 1-2

then can use the 80387-16 co-processor

2. 386 CPU is running under 20MHz

J54 should be OPEN
J55 should be short on 1-2

then can use the 80387-20 co-processor

3. 386 CPU is running under 24MHz

J54 should be CLOSE
J55 should be short on 2-3

then can use the 80387-20 co-processor